

EIGHTIES

AT

INDIAN INSTITUTE OF SCIENCE

AN OVERVIEW

DIRECTOR'S REPORT

Court, March 1990



DIRECTOR'S REPORT

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INSTITUTION OF THE INDIAN INSTITUTE OF SCIENCE

BANGALORE - 560 075

Dear Mr. President and Colleagues,

We have just entered a new decade and at the end of this decade, we shall be starting a new century. I think it would be most worthwhile for us on this occasion to review the progress made by the Institute over the last decade.

COURT

9 March, 1990

1. **Students:** Our flow chart shows that the number of students entering the research and post-graduate courses has increased but is stabilizing at present, 1,400 (Fig. 1) which is about 15% more than the number in the last year. The number of research students in the Institute has been increasing ever since 1970 while the strength in graduate courses has remained roughly constant (Fig. 2). The number of students who have been awarded the Post degree (Fig. 3) is around 120 to 125 every year and the Master's degree in Engineering (Fig. 4) is around 220. It is noteworthy that the number of students in the research programme leading to M.Sc./Engg. degree is on the increase.

2. **Teaching and Education:** The Institute has a long tradition of excellence in the field of Science, Engineering and Technology. The Institute has been a pioneer in the post-graduate level, where it has been a leader in the field of research and development. The Institute has been a pioneer in the field of research and development. The Institute has been a pioneer in the field of research and development.



INDIAN INSTITUTE OF SCIENCE
BANGALORE

100th Anniversary of the Indian Institute of Science

DIRECTOR'S REPORT

COURT of the Indian Institute of Science

9 March 1990

Dear Mr. President and Colleagues,

We have just entered a new decade and at the end of this decade, we shall be starting a new century. I think it would be most worthwhile for us on this occasion to review the progress made by the Institute over the last decade.

1. **Students:** Our first constituency is the student body. Student strength in research and postgraduate courses has increased, but is stabilising at just over 1,400 (Fig 1) It will remain around 1500 for the next two to three years. The number of research students in the Institute has been increasing year by year while the strength in graduate courses has remained roughly constant (Fig.2). The number of students who have been awarded the PhD degree (Fig.3) is around 100 to 125 every year and the Master's degree in Engineering (Fig. 3) is around 220. It is noteworthy that the number of students in the research programme leading to M.Sc. (Engg) degree is on the increase.

2. **Teaching and Extension:** More than 500 courses in various disciplines of Science, Engineering and Management at the postgraduate level, some addressed to doctoral students are offered at the Institute. Regular and frequent academic review is undertaken to see that the courses give a proper understanding of the basics and take the students to the frontiers of the chosen field.

The innovative continuing education programme, PROFICIENCE, initiated some years ago for scientists and engineers working in research laboratories and industries has been extremely well received. The number of registrants for these courses held in the evening has now stabilised around 1400 per year (Fig.4). In addition, the short-term intensive courses (around 20 in number), tailor-made to specific requirements, have received widespread acceptance and acclaim (Fig.5). Collaboration with 15 national professional scientific bodies in formulating and conducting these programmes is a unique feature, promoting meaningful interaction between the academia and professionals in the laboratories and industries.

We have a large number of intensive courses, workshops, symposia and discussion meetings at the Institute. On an average, the Institute runs about 40 such national and international meets every year. The number of participants in such programmes is around 1,000 or more.

A training cell in the Institute drawing faculty in different disciplines from academic and industrial organisation imparts continuing in-house training to our own administrative and support personnel at all levels. This is a new innovation.

3. Research: Faculty and students of the Institute publish around 1300 research papers per year (Fig.6) in learned national and international journals. This is not just a matter of numbers alone. The quality of publications, I believe, is definitely on the increase and I will mention about this towards the end of my presentation.

4. Personnel: Among the four categories of staff in the Institute, (Fig.7), namely academic (Fig.8), scientific and Technical (Fig.9), administrative officers and other personnel (Fig.10), the number of maintenance staff (Fig.11)

is a little high; It has stabilised over the last two or three years. Similarly the number of administrative staff has stabilised, and I hope that it will start decreasing. The technical staff has more or less stabilised and I believe that it will not go beyond the present strength. We shall try not to increase the administrative, support and maintenance staff.

Overall, I feel that the support staff strength is on the high side; the inflow has been kept to the most essential minimum number to sustain activities (Fig.12) with a view to stabilise the staff position.

The number of academic staff is about 470 and this has also more or less stabilised. Let us look at the faculty age profile (Fig.13). In the age group of 30 to 35 the number has increased through recent induction (Fig.14), but still the number in the age group 50 and 60 is large. We shall try to improve the number in the younger age group a little more in the next year or two so that we have a healthy age profile of the faculty.

5. Sponsored Research Schemes: We have a large number of research projects sponsored by several agencies. Various categories of personnel - scientific/project assistants, mechanics, technicians of various kinds, research fellows, administrative & support staff work (Figs.15 & 16) in the schemes over varying periods of time. Here too we are making substantial effort to have only the necessary support staff.

6. Estate: Let us take a minute to look at the position of our Estate (Chart 1). New land has been acquired and several things have happened. A residential campus has been created at Vijnanapura on about 7 acres of land given to the Institute as a Platinum Jubilee Gift by the Government of Karnataka. In the Northern Boundary 4 1/2 acres has been obtained as

settlement for Institute land taken away earlier for creating a road link by the Bangalore Development Authority. For the Jawaharlal Nehru Centre for Advanced Scientific Research (a sister organisation working in association with the Institute), we have got about 15 acres near Jakkur from the Government of Karnataka and a new campus will soon come up there. We have completely consolidated our estate - took possession of valuable land occupied by outsiders and making a slum in Yeswanthapur, Subedarpalya and related areas. At last, we can say that the entire campus has a boundary wall.

We have done a lot of tree planting. Nearly 12,000 trees have been planted in the last 3 to 4 years and campus is growing greener everyday.

7. Buildings: From 1985 to 1990 the floor area of buildings for academic work (Figs.17 & 18) has increased substantially to nearly 2,10,000 m². Among the academic buildings, I would specially mention the new Mathematics building, Primate Research Laboratory, Central Animal Facility, Centre for Electronics Design Technology and the Centre for Theoretical Studies. Physics has the new Raman wing. A building of the Supercomputer Education & Research Centre is getting completed. We are now building a new laboratory for Mechanical Engineering. The Centre for Atmospheric Sciences will soon have a separate building. A number of other departments have got additional space (Chart 2). Student accomodation has substantially increased (Figs.19 & 20). Married men and women students also have more accommodation (Fig.19).

8. Facilities: We have got several new facilities: **Rustum Choksi** Hall for seminars, New blocks for Administration, Security and Health Centre, additional space in the Central School and in the Guest House. A new Guest House called **Krishnaraja** has been completed. Hoysala House accomodating academics participating in Confer ences/Seminars and Workshops is now

bigger. The National Science Seminar Complex with the J.N. Tata Auditorium is coming up. In the last five years, there has been a steady increase in staff housing (Fig.21 & Chart 3). I am not going through the details but it has been quite substantial.

9. Utilities & Services: Utilities such as electric power supply and water supply have improved significantly (Chart 4). We have several borewells and a new water distribution system being worked on. We have a new sewerage system. Modernisation has occurred -- new roads, mercury/sodium vapour street lamps, better phone facilities.

Our Health Centre (Chart 5) is something to look at, because every one who is of middle age seems to have some problem or the other. The health profile of our personnel is revealing. A large number of people have problems. It is important that we know what the health problems are and do something about them. On an average, about 180 people see the Institute doctors every day. It is quite a large number. Even our Dentist and the Ophthalmologist examine a large number of patients. In fact, many people do not realise that what we have is just not an ordinary support Health Centre, but a Centre catering to a lakh of out-patients per year.

10. Finances: The Block Grant for recurring expenses which was of the order of about Rs.6 crores 6 years ago has now reached 16 crores (Fig.22), a large proportion of which goes into salaries, scholarships and the most essential utilities (Fig.23).

Energy cost has increased enormously (Fig.24). We are now spending about Rs.80 lakhs per year on the electricity bill alone. Similarly, the cost of subscription to books and journals has increased. Today, the Library budget

(Fig.25) is nearly a crore of rupees per year. Just 5 years ago, it was about Rs.40 or 50 lakhs.

Our **Plan Grant** (Fig.26) is of the order of Rs. 12 crores for the VII Five Year Plan and I hope that we will be able to get around Rs. 20 crores in the VIII Plan. We can manage even if we get about Rs.15 crores.

11. Research Equipment and Infrastructure: In the last five years we have spent about Rs. 28 crores from various sources, for equipment in the Institute. Personal Computers are spread all over and laboratories have reasonable scientific equipment. We have had reasonable funding for this purpose because several agencies have helped in supporting our research. The recognition of many of our departments as special centres of advanced study by the UGC has been of great help. Even so, I believe that we have just crossed the threshold of zero level in scientific infrastructure. At best, it is just above the ground level. I cannot say that the infrastructure is sufficient for a modern Institute of science and engineering, carrying out competitive research in frontier areas.

12. Some New Directions: We have initiated some important new academic programmes, one of them being the **Integrated Ph.D Programme in Chemical Sciences** to attract brilliant young science graduates.

In terms of new thrust areas, I would like to mention that Biology is growing in a very big way. In fact, we are expecting a major grant for Biology for the next five years. A new Centre for Reproductive Biology & Molecular Endocrinology, a Centre for Genetic Engineering and a Laboratory for Genetics and Developmental Biology have been created. The Centre for Ecological Sciences and the Centre for Atmospheric Sciences formally came into being about eight years ago.

We have been able to get the **Jawaharlal Nehru Centre for Advanced Scientific Research** to the Campus. Through this Centre, I believe, that the Institute will have considerable benefit. There will be mutual dependence of the two institutions and modalities are being worked out to make sure that they reinforce each other.

We have aggressively gone about **faculty recruitment** in almost all the areas. Some departments have been able to recruit quite a few faculty members, coming from the best Institutions in the world. We have been successful in some areas such as Condensed Matter Theory, Chemistry, Mechanical Engineering and Biology. We are moderately successful in Engineering, not so successful in Experimental Physics, Materials Science and Computer Science.

Separate **faculty groups** in engineering and sciences submitted their reports last year on forward planning for research and education. Many of their recommendations are being executed. We have to some extent rationalised the activities of Laboratories, Centres, Departments and Units of the Institute. We have some clarity about these different terms, though not yet fully satisfactory.

I must say that the computer utilisation culture at the Institute has spread widely. The only fear I have is that it may stop people from doing experiments. I often joke with friends that scientists and engineers are becoming good typists using their personal computers. We have to take this risk. Without these computers, I do not think that we can do better experiments either. We should not forget that it is experimental work alone that is the backbone of an Institution like this.

We have gone through a difficult period about the Supercomputer - six years of agony, one may say. The building and support system to house it are

ready. I am very happy to report we have placed an order for the Front-End Cyber 992. Dr.Gopalan of the MHRD has just informed me that the Government has cleared the grant of nearly Rs.30 crores for the Supercomputer.

I am glad to report that Mr.JRD Tata has kindly informed me today that he has been able to get from the Tata group of Companies an additional Rs.25 lakhs for the JN Tata Auditorium. And we hope within a few months we will have the JN Tata Auditorium and the National Science Seminar Complex functioning.

13. Acknowledgement: I would like to thank the University Grants Commission, Ministry of Human Resources Development (Dept. of Education) and others for their financial support. The UGC has recognised many of our Departments as Centres of Advanced Study. I would specifically mention the Council and our Chairmen - Mr.GK Chandiramani and Dr. Raja Ramanna, Faculty and Students and the powerful Divisional Chairmen and the Deans as well as the Departmental Chairmen. The Chairmen of Departments and Divisions are becoming more and more powerful and it is good if administration gets slowly delocalised. I thank our Chief of Planning, Registrar, Financial Controller and other Officers who are more powerful than what meets the eye.

14.THE FUTURE LIES WITH THE FACULTY:

I would like to specially say something about my dear colleagues, the faculty. It is said that there are three factors involved in the success of an academic institution: the students, the faculty and the administration. About the students, we roughly know the kind of students we get. Administration, if bad, can pull down an Institution. Eventually, the real positive contribution in an educational institution has to mainly come from the faculty. Of course, good

students promote quality just as good administration helps in maintaining quality. It is, however, the faculty that will mainly determine the future. Ideas, good as well as great, have to emerge from our faculty members. If the faculty is strong, no external or internal threat can destroy the academic atmosphere. I feel that the faculty members of this Institute have been an excellent group to work with. They are extraordinary, in many ways. When good things happen, like good scholars any where, they never say "good". They just keep quiet. When lots of growth and development occur in the campus, they just look aside. When things happen to go bad of course, they become critics. These are singular signs of intellectuals. Intellectuals never praise. In spite of this benign indifference that our faculty members may seem to show some times, they are really wonderful. They have a fantastic record. Every teacher and every research worker in the Institute in his or her own way, has been unique.

The Institute and its traditions are being maintained only because of the faculty. One of my colleagues from outside who came here said that this is the only Institute in the country which is still maintaining certain traditions. For example, on the third of March every year, we gather for half-an-hour just to lay a wreath in front of the Founder's statue. There is no pomp or ceremony in most things we do. We do not have big convocations, but we have 40 major lectures by eminent people every year. Our Professors have received many honours and several distinctions. It is difficult to find a better bunch of good fellows like the faculty of this Institute. At the end of the decade of the 1980's, the Institute faculty deserves special thanks. I would like all of you to join me in thanking them, because it is this faculty that has to take the Institute through the next decade and then to the next century. When the next century comes, I won't be here in any formal capacity. Of course, I may be allowed to work in a laboratory or visit the Institute gardens. Many of the young faculty members here will be middle aged then and will be the leaders of our community. I feel that with them as leaders, science and technology in the country is in safe hands. They are really the people who will be protectors of excellence.

I am not saying that we have nothing bad or indifferent, or that we are doing everything wonderfully. By and large, things look optimistic. The arrow to the future is pointing at the right direction and the slope of progress is positive. Very few institutions can say that the slope has always been positive. For more than eighty years, the slope of this Institute has been positive - may not be very highly positive, but always finite and positive. It may be more positive sometimes, less some other times, but never negative. This is very important. The accumulated wisdom of this Institute, distilled by the faculty in the form of a message, when conveyed to the society in India will become, I hope, a major force in science, technology and education.

Thank you so much.

STUDENTS ON ROLL

As on 31 March

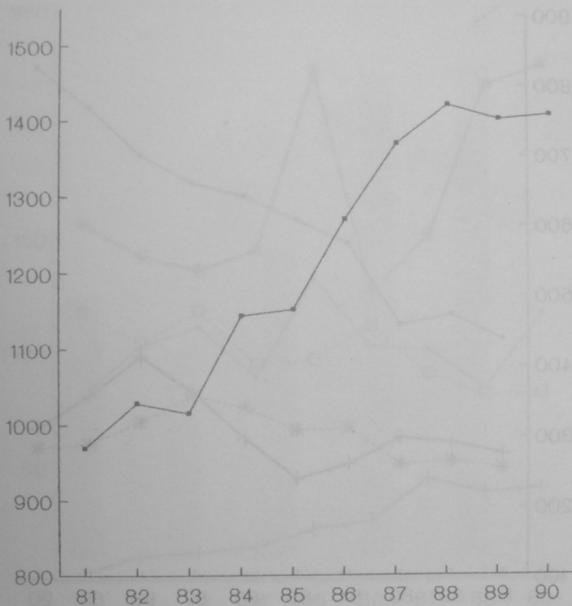


Fig.1 Students on roll — Total

STUDENTS ON ROLL

As on 31 March

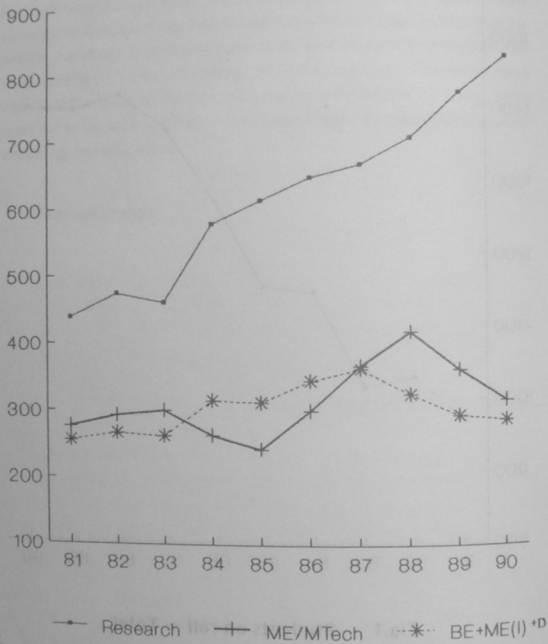


Fig.2 Students in research and course programmes

DEGREES AWARDED

As on 31 March

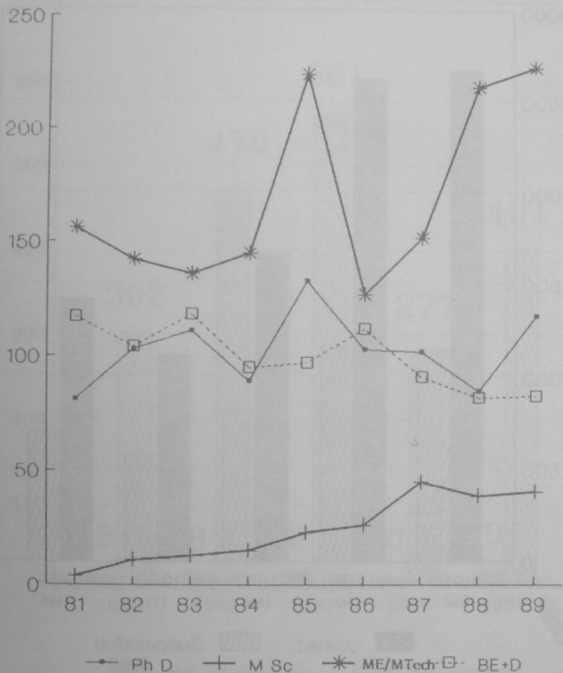
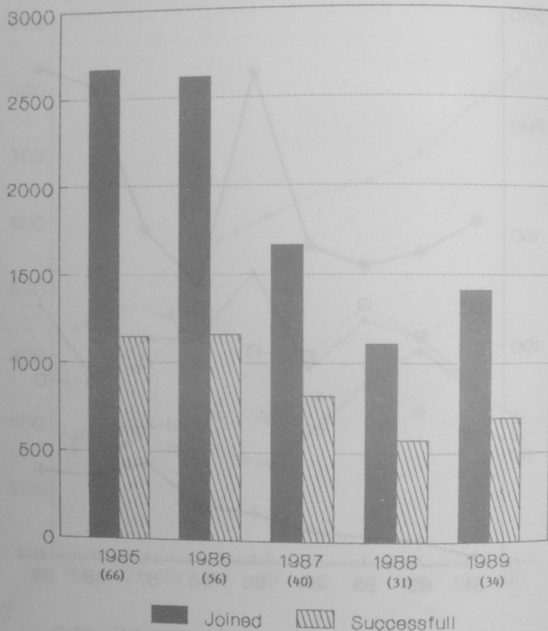


Fig.3 Degrees awarded for research and courses

PROFICIENCY



Figures in parenthesis indicate number of courses offered

Fig.4 Continuing Education students

Short Courses

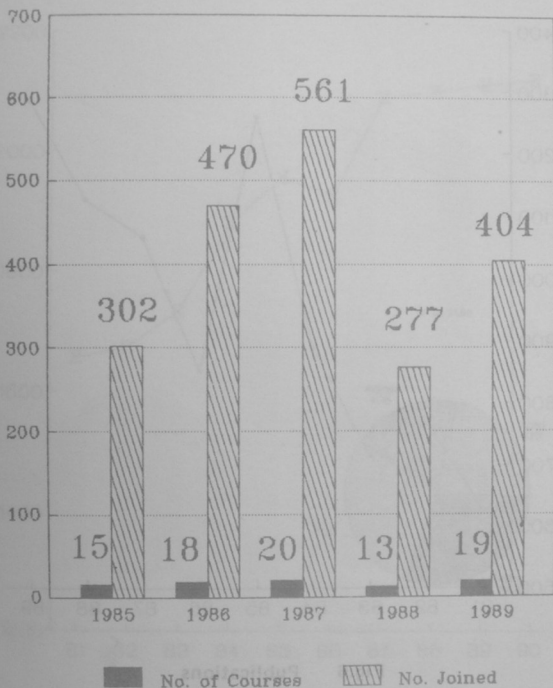


Fig.5 Students taking short-term Continuing Education Programmes

PUBLICATIONS

As on 31 March

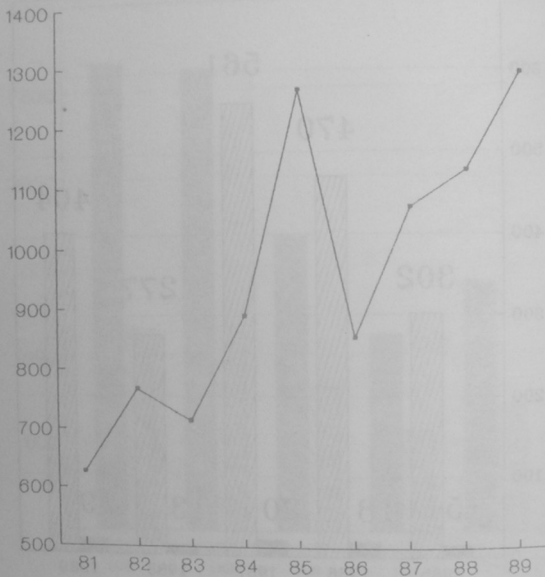


Fig.6 Publications

STAFF

As on 31 March

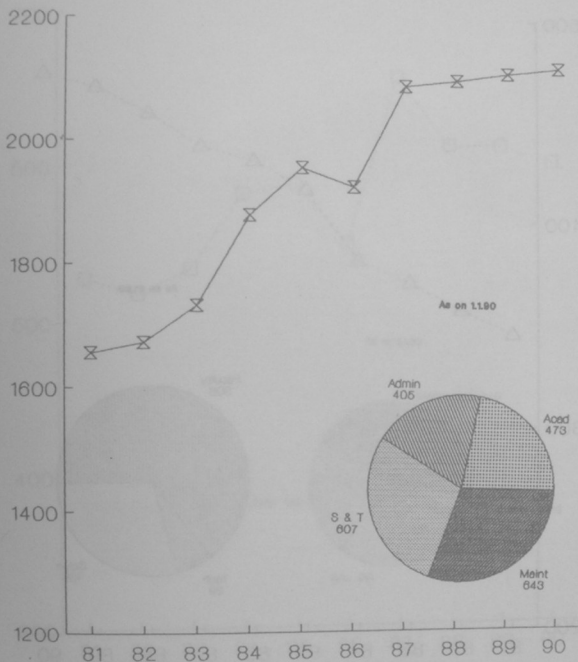


Fig.7 Personnel

ACADEMIC

As on 31 March

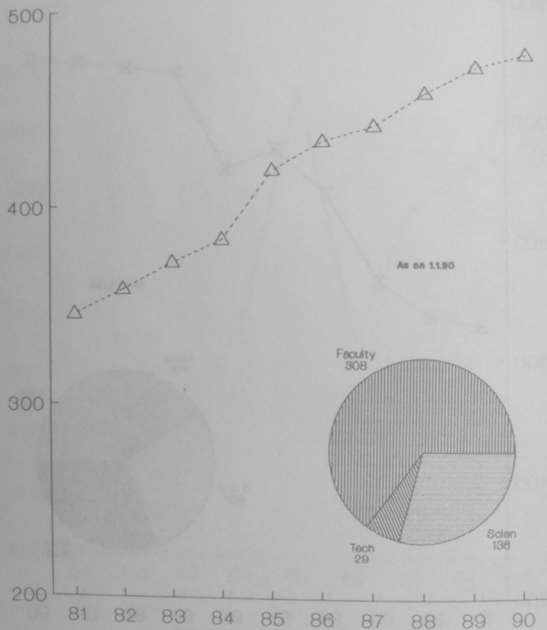


Fig.8 Faculty, Scientific and Technical Officers

SCIENTIFIC & TECHNICAL

As on 31 March

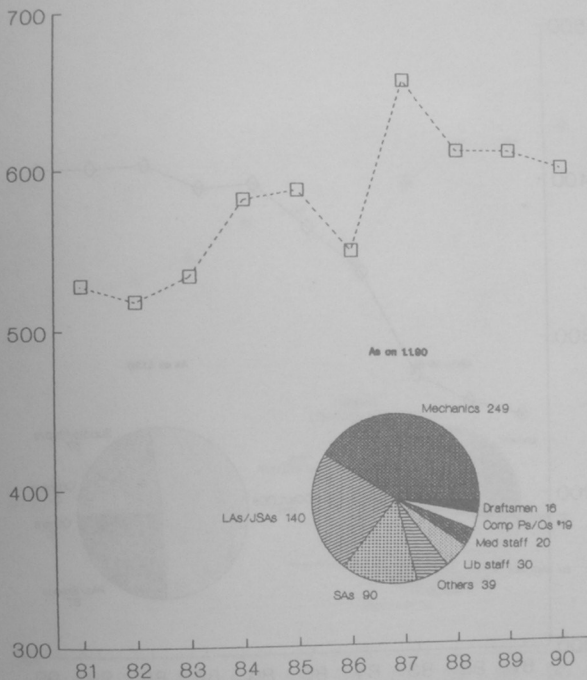


Fig.9 Scientific and Technical staff

ADMINISTRATIVE

As on 31 March

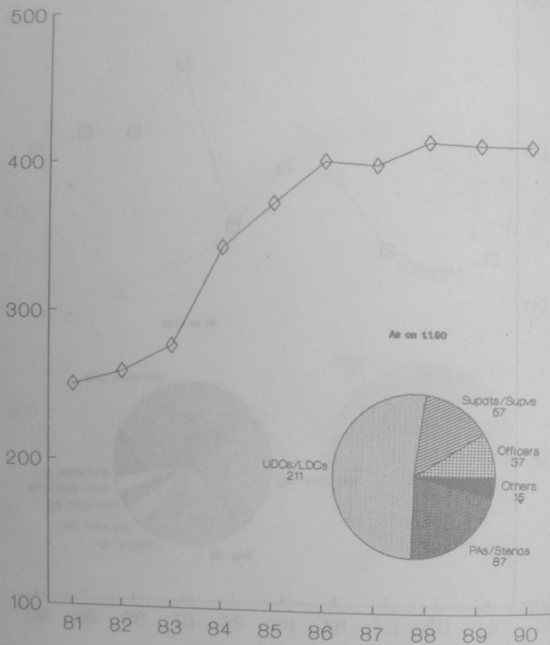


Fig.10 Administrative Officers and Personnel

MAINTENANCE

As on 31 March

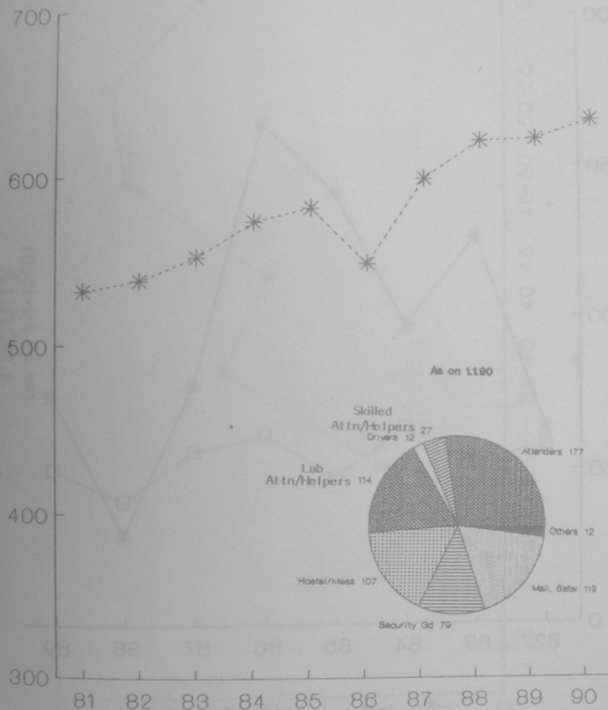


Fig.11 Maintenance staff

STAFF OUTFLOW/INFLOW

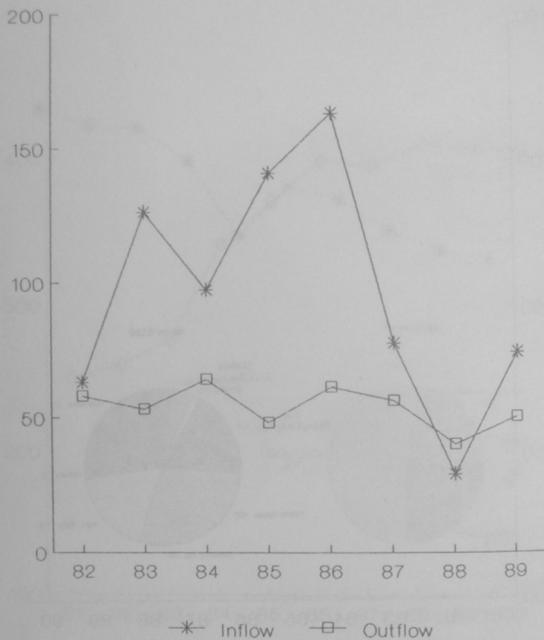


Fig.12 Inflow, Outflow — Support staff

Faculty
(as on 1-1-1990)

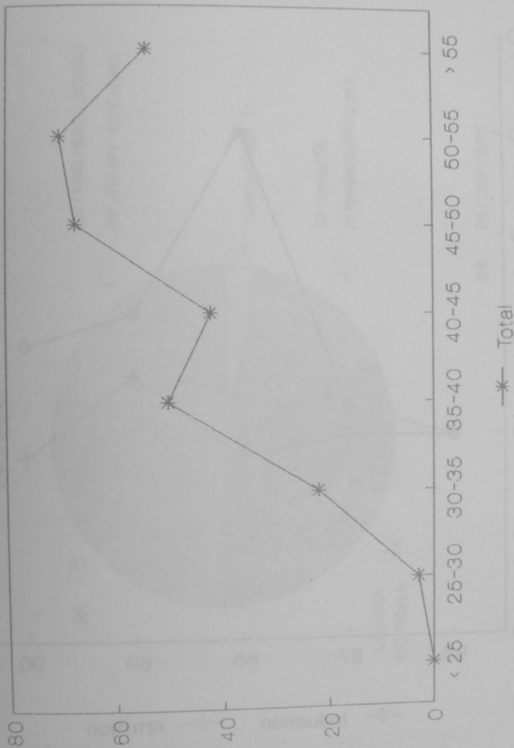


Fig.13 Faculty in age groups

FACULTY

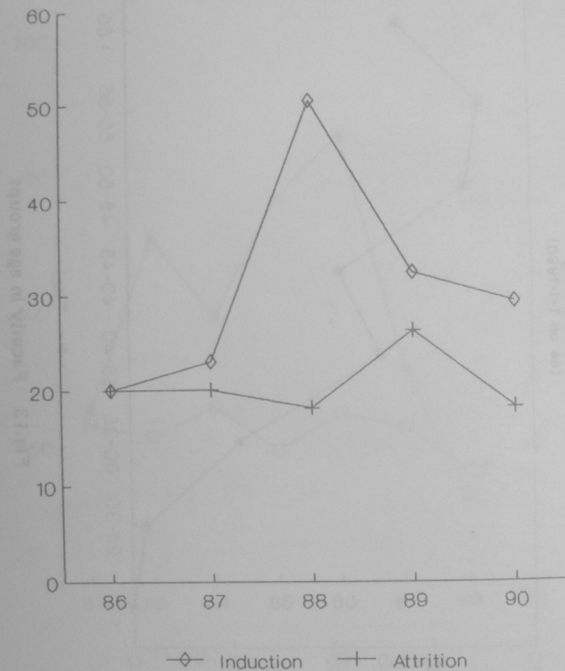


Fig.14 Faculty — Joining, out-going

SCHEMES Personnel

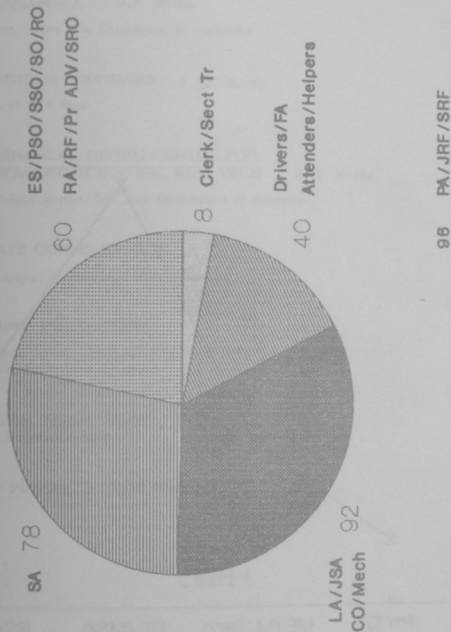


Fig.15 Personnel in Research Schemes

SCHEMES - Personnel (Qualificationwise)

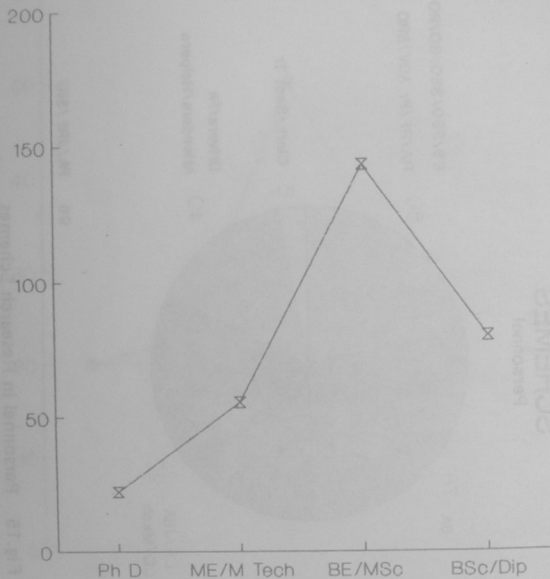


Fig.16 Qualification — Schemes personnel

ESTATE

* VIJNANAPURA 6.7 acres

Platinum Jubilee gift, Government of Karnataka

* NORTHERN BOUNDARY 4 1/2 acres

In lieu of BDA Road

* JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH 16.5 acres

Near Jakkur Airport, Gift land, Government of Karnataka

* ESTATE CONSOLIDATION

Yeshwantpur, Subedarpalya lands recovered

* CAMPUS PROTECTION

Compound raised - South-Western, South-Eastern,
Northern Boundary & Gymkhana

* Platinum Jubilee Garden and Extension laid

* Tree Planting > 10,000 trees planted

Chart 1

BUILDINGS

(Area in Sq.m)

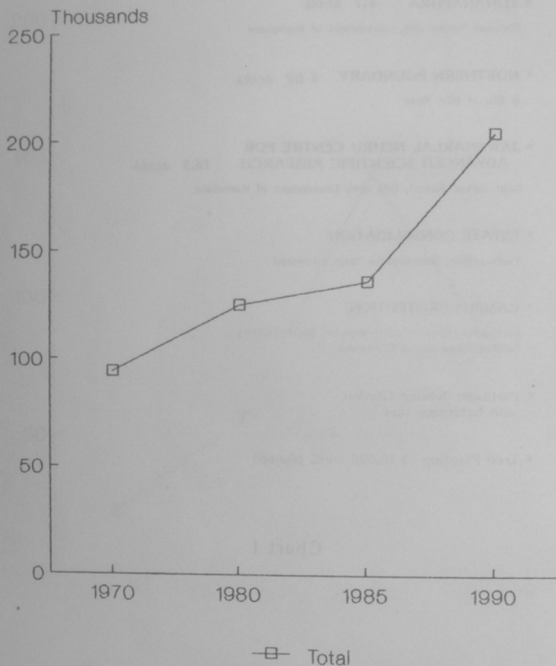


Fig.17 Building area on the campus

Buildings Area in sq.m

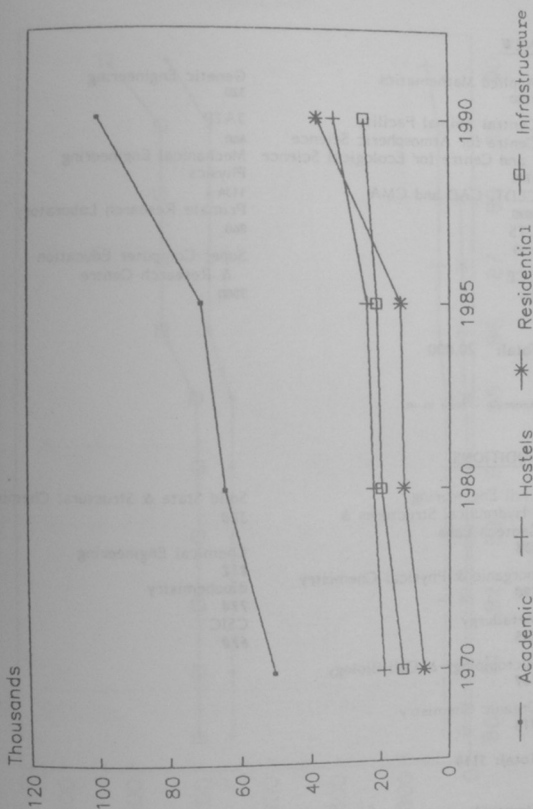


Fig.18 Academic, Hostels and Residential areas since 1970

ACADEMIC BUILDINGS

NEW

Applied Mathematics
1160

Central Animal Facility

Centre for Atmospheric Science
and Centre for Ecological Science
1760

CEDT, CAD and CMA

3890

CTS

1125

CCE

306

Genetic Engineering
320

JATP

440

Mechanical Engineering
Physics

1134

Primate Research Laboratory
860

Super Computer Education
& Research Centre

7500

Total: 20,000

Numerals - area in m^2

ADDITIONS

Civil Engineering
- Hydraulics, Structures &
Geotech Labs
838

Inorganic & Physical Chemistry
290

Metallurgy
865

Microbiology & Cell Biology
137

Organic Chemistry
418

Total: 5114

Numerals - area in m^2

Solid State & Structural Chemistry
370

Chemical Engineering
812
Biochemistry
714
CSIC
670

Chart 2

HOSTEL ACCOMMODATION (Capacity)

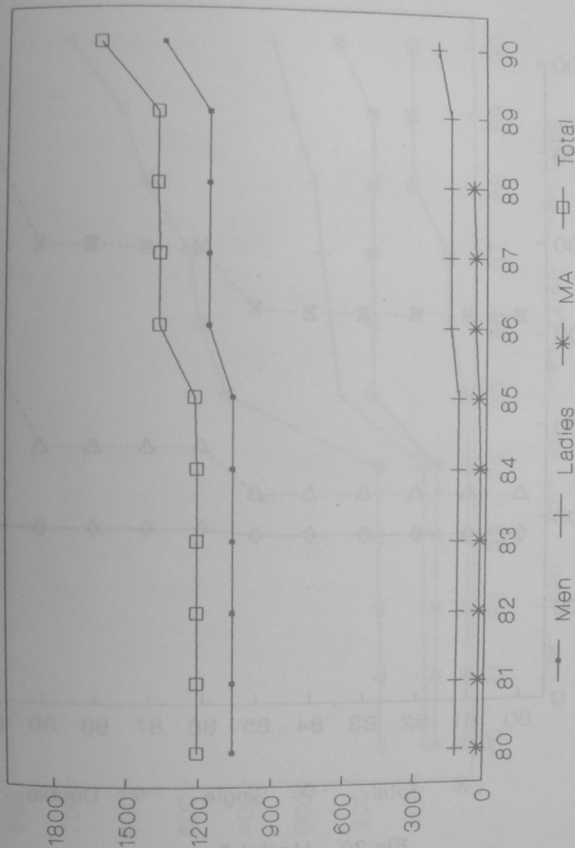


Fig.19 Students Accommodation on campus

HOSTEL ACCOMMODATION (ROOMS)

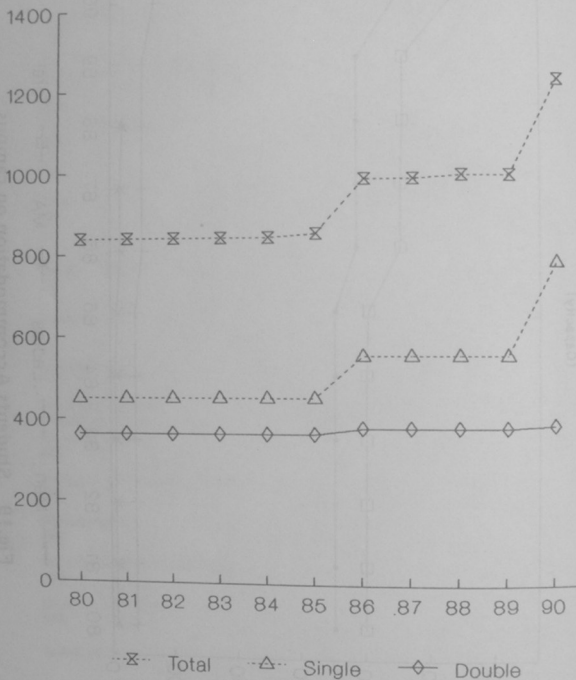


Fig.20 Hostel Rooms

HOUSING (Including apartments)

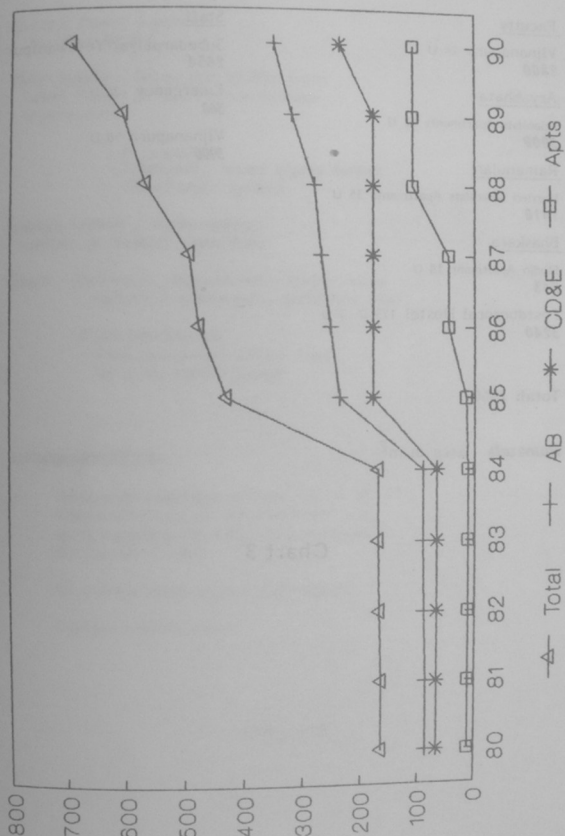


Fig.21 On campus Residential units

HOUSING

Faculty

Vijnanapura 24 U
2800

Aryabhata

Scientists Apartments 72 U
3900

Ramanujan

Married Scientists Apartments 35 U
1410

Bhaskara

Studio Apartment 18 U
343

Postdoctoral Hostel 173 S 7 D
3240

Total: 18607

Numerals - area in m²

Staff

Subedarpalya, Yeshwantpur 51 U
2654

Emergency 24 U
360

Vijnanapura 58 U
3900

Chart 3

UTILITIES

Electric Power Supply
hot line, 66 KV

Water supply - direct line to IISc from
Jewel Filters & Distribution System
Improvement

- Borewells
- Emergency water supply tanker
- Distribution system

Sewage system - modernisation
Eastern & Western main lines

Roads - Extension, improvement, traffic signs
surface improvement, perimeter road

Road illumination
- main pedestrian traffic ways
Na & Hg vapour lamps

COMMUNICATION

Dedicated telephone system - RAX 60
lines connecting all the administrative
units including the Library, Hostel and
the Health Centre

Electronic telex system and telefax

Campus mailing system

Chart 4

HEALTH CENTRE

Coverage:

Students: 1450
Staff: 1637

Scheme: 1250
Dependents 6200

Total: 10537 +
12 AMOs: 2750

Out-patients:

Day average: 180 (70 new, 110 repeats)
Annual: 95000 to 98000

In-patients:

Day's care: 5 to 10, Emergency: 3 to 5, Referrals: 5 Admissions daily: 3 to 4
Admissions per annum: About 500 Bed utilisation: 90%

Consultants/ Specialists:

	<u>Days in a week</u>	<u>Patients per day</u>
Dentistry	5	20
Ophthalmic	5	10
Physician	3	8 (5 new, 3 review)
Psychiatry	2	5 (2 new, 3 review)
Clinical (Psychology)	3	5 (2 new, 3 review)
Radiology	3	12
Ultrasonic	3	4

Personnel:

Doctors: 4, Para Medical: 12, Support 15, Total: 31

Chart 5

FINANCE

Rs. in lakhs

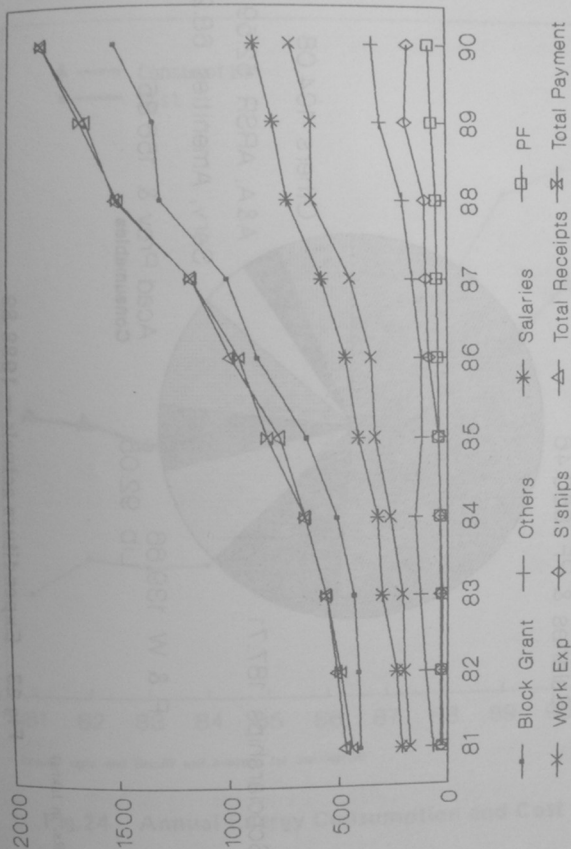
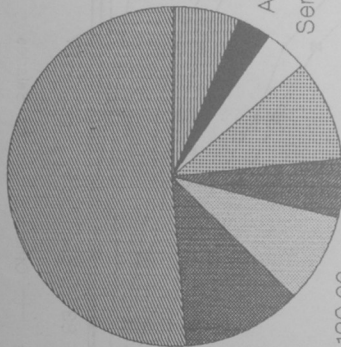


Fig.22 Recurring Grants and Expenditure in the 80s

EXPENDITURE

ACTUALS 1988-89

Salaries & PF 850.46



Scholarships 187.71

P & W 139.66

Lib 92.05

Acad Prov & Consumables 156.85

Serv, Amenities 68.21

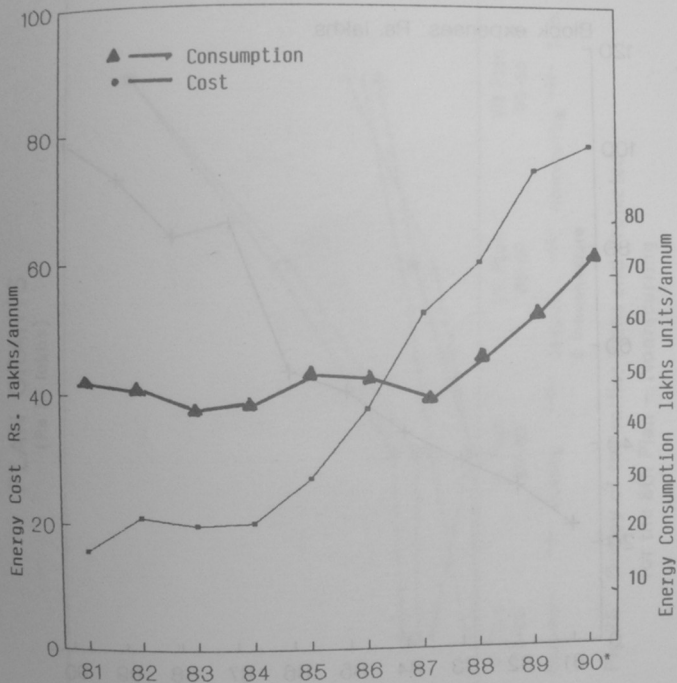
A&A, ARSR 52.59

Others 104.08

(Rs. in lakhs)

Fig.23 Expenditure actuals — 1988-89
Recurring expenditure items under the Block

ENERGY



* Actuals upto end Dec.89 and average for Jan-Mar.90

Fig.24 Annual Energy Consumption and Cost

LIBRARY

Journals and Books

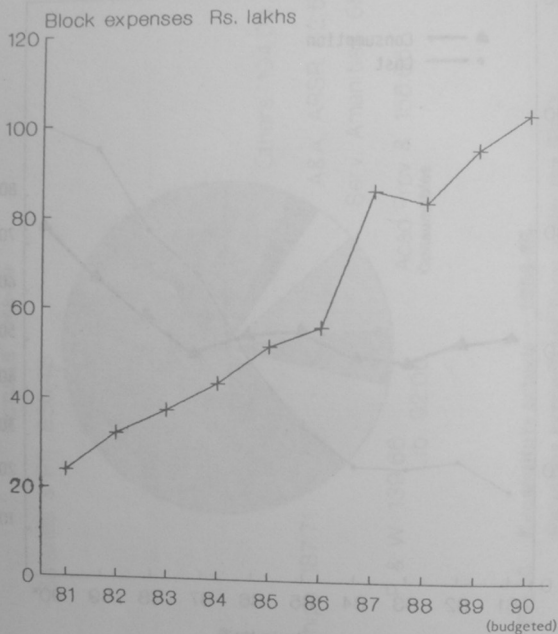


Fig.25 Library Expenses — 1981-90

PLAN GRANTS (Rs in lakhs)

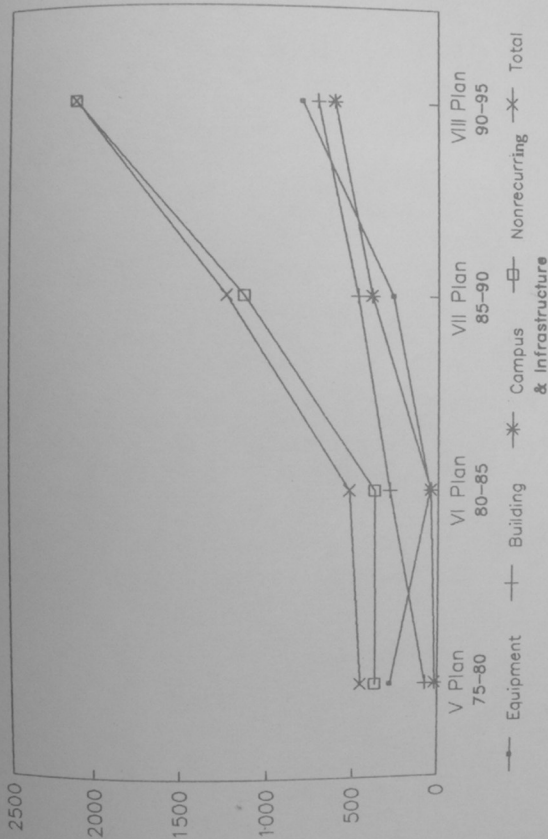


Fig.26 Outlay of the earlier Plans and Projected for the 8th Plan — Nonrecurring